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# Reliability of Student Feedback on the Course Teaching Evaluation System (CTES) and System Usability

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**Abstract**

The Course Teaching Evaluation System (CTES) is a system which has been created to evaluate the quality of the teaching of courses in UKM. It is one of the student feedback systems which provide important input to continuously improve the quality of study programmes in all faculties. A study on UKM's CTES was conducted. The study focuses on the reliability of student feedback on CTES and the effectiveness of the system in revealing the effectiveness of teaching in a few predetermined aspects. The study was based on stratified random sampling of UKM students. The research methods used include observation made through eye tracker, questionnaire and interview. The research results would fulfil the main aims of the study, which are to explore whether the students have read the questions on CTES in detail before answering them and whether students give the questions sufficient thought and consideration before answering them. The findings would be used to determine the reliability of student input on CTES. The reliability of the feedback is very important in the quest to identify the effectiveness of teaching in the aspects of course content, infrastructure, equipment, laboratory and the teaching achievements of the lecturers.
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*Keywords*: Course Teaching Evaluation System; Reliability; Usability; Feedback;

## 1. Introduction

The Course Teaching Evaluation System (CTES) is a system which evaluates the quality of course teaching based on the perspective of students. It is one of the official user feedback systems used to evaluate the efficiency and effectiveness of the Quality Management System (QMS) of MS ISO 9001:2008 for Undergraduate and

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Postgraduate Studies. Additionally, input gathered from students through this system is used to continuously improve the quality of relevant courses. The CTES questions are divided into three sections:

i. General (7 questions for course content, infrastructure and equipment),

ii. Faculty/Centre/Institute (3 – 10 questions for every teaching mode),

iii. Lecturer Evaluation (5 questions for every lecturer who handles the course).

The General and Lecturer Evaluation sections are used to evaluate the achievements of quality objectives SPK MS ISO 9001:2008, in addition to continuously improve the quality of teaching and course delivery, while the Faculty/Centre/Institute section is specifically used for the needs within each Faculty/Centre/Institute to improve the quality of teaching, design and review of curriculum. In UKM's quest to improve the quality of teaching, the commitment from students is very much relied upon to complete the feedback. Therefore, students are required to answer all the listed questions based on the Likert scale 1-5 according to the individual instructions. The following paragraph explains the research approaches which were used, that is *eye tracking* and usability.

### 1.1 Eye tracking

Research related to eye movement and fixation began more than 100 years ago (Rayner & Pollatsek 1989). Research shows that what is fixated by the user could be considered as the thinking focus of the user's cognitive processes (Just & Carpenter 1976). The measurement of eye movement could inform human-computer interaction and pilot's mental processes more clearly and in more detail (Flemisch 2000).

Eye tracker uses infrared light that illuminates the user's eye. Reflections occur on the eye lenses and cornea, which is termed as Purkinje image (Sohel Merchant 2001). The Purkinje image dots are compared to measure the location of the user's eye. Eye movements could offer record of scanning patterns, which is presented as a type of fixation and fixation linked by *saccade* (Tzanidou 2003).

*Fixation* is the eye's focus on an object, which requires 300 – 400ms for the cognitive process to understand the information (Barrios et al 2005). High number of fixations on specific parts indicates higher interest or priority (Fitts, Jones & Milton 1950), or otherwise shows that the area is complex and difficult to code (Jacob & Kam 2003; Just & Carpenter 1976). On the other hand *saccade* is ballistic eye movement, which occurs in 100 – 200 ms only (Salvucci & Goldberg 2000). No information is processed during a *saccade.* In addition, more *saccades* imply more searches (Goldberg & Kotval 1999).

### 1.2 Usability

Usability measures the quality of experience during the interaction between the user and a product or system. It has also been referred to as a concept identified by research on user, product and environment (Azizah 2005). ISO 9241-11 defines usability as "…the effectiveness, efficiency and user satisfaction in order to achieve certain aims in certain environment".

In the education environment, the definition of usability could be realized more easily. The effectiveness parameter could be measured through a few methods including the completion of assignments given to students. The efficiency parameter could be determined by the time required by students to complete an assignment. User satisfaction involves perception on ease of use, information organization, labelling, detail and visualization, content, and error correction. Perception on satisfaction is measured through the questionnaire which uses the Likert scale (Read et al. 2002).

## 2. Research Aims and Objectives

In general, this research aims to investigate the usability of CTES among users, specifically to investigate the reliability of student feedback on CTES. Some other objectives have been identified to strengthen the aims of the research. Among the research objectives are as following:

i. Identify reliability of student input on CTES feedback.

ii. Determine user difficulty among users in using CTES.

iii. Investigate user perception toward CTES through the parameters of effectiveness, efficiency and user satisfaction.

## 3. Research Method

This research emphasizes the issues related to the interface difficulty of CTES's usability. The research also emphasizes the behaviour of users especially the eye movements during the navigation of CTES's interface. The research involves three main usability elements defined by ISO, i.e. user, assignment and the environment where UKM students complete the given assignments and experiments which the user conducts in the laboratory environment.

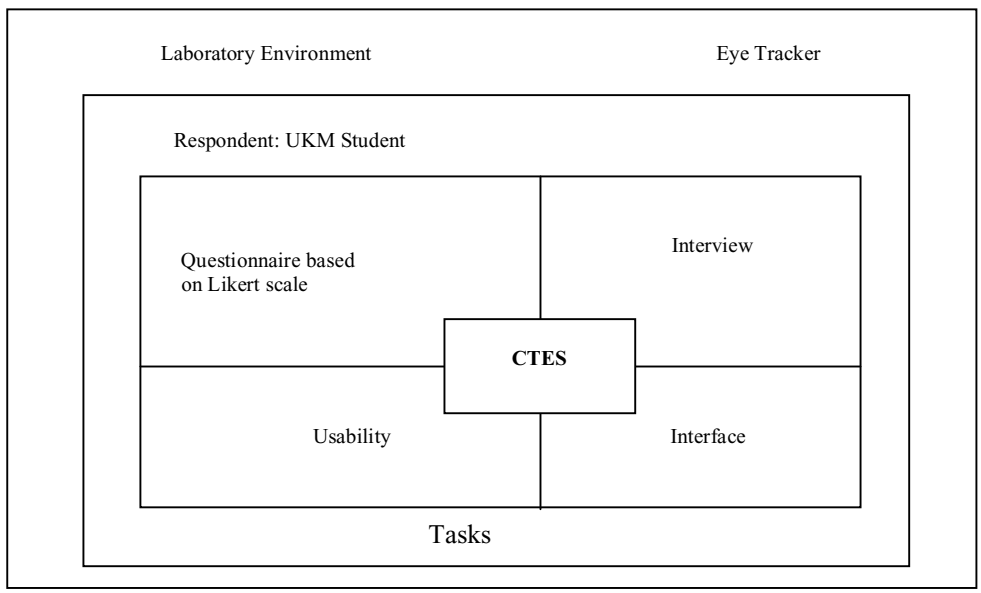


Figure 1 Research Conceptual Framework

Figure 1 shows the conceptual framework of this research. In general, the research utilises three research methods, namely:

i. Eye Tracker tool in usability laboratory owned by the Multimedia and Usability Research Team, FTSM

ii. Questionnaire

iii. Interview

### 3.1 Research Sample

There were 9 to 11 UKM faculties involved in this research, Faculty of Engineering and Built Environment (FKAB), Faculty of Technology and Information Science (FTSM), Faculty of Science and Technology (FST), Faculty of Education (FPend), Faculty of Law (FUU), Faculty of Islamic Studies (FPI), Faculty of Economics and Trade (FEP), Faculty of Social Science (FSSK), Faculty of Pharmacy and Faculty of Dentistry (FGG). More than 90% participants involved in the research were undergraduates, where most of them were in their second year of study or more in UKM or in other words the participants were experienced users of CTES. Most participants had personal computers at home and they used the Internet every day, especially in communicating such as email, blogs

or messenger. Therefore, more than 50% of students categorized themselves as good and excellent users of Internet services. This is shown by the 72-88% of students having good eye fixation while viewing the monitor screen through the calibration of eye fixation with the margin of error less than 0.5.

### 3.2 Categorization and Reliability of Questionnaire

There were two types of questionnaire involved in this research, Pre-Analysis Questionnaire on the Course Teaching Evaluation System (PrAQ-CTES) at the beginning of research and Post-Analysis Questionnaire on the Course Teaching Evaluation System (PoAQ-CTES). The mean average score indicator which had been developed is shown in Table 1.

Table 1. Mean average score performance questionnaire

| Mean average score | Performance |
|---|---|
| 1.00 – 1.40 | Very weak |
| 1.41 – 2.80 | Weak |
| 2.81 – 4.20 | Average |
| 4.21 – 5.60 | Good |
| 5.61 – 7.00 | Excellent |

PrAQ-CTES and PoAQ-CTES are research instruments which have high reliability. Both questionnaires have alpha Cronbach value exceeding 0.70, where PrAQ-CTES has alpha Cronbach 0.73 and PoAQ-CTES has alpha Cronbach 0.86.

## 4. Research Results

Research results provide information for the three main objectives which were to determine the reliability of student input on CTES feedback as well as to determine user difficulty and user perception in the use of CTES.

### 4.1 Research Sample Demographics

The research was conducted on 42 students (55% male and 45% female) from 9 UKM faculties. Each faculty was represented by five students except FPI which was represented by 4 students and FF which was represented by three students only.

### 4.2 Reliability of input from CTES participants

During the exploration of the reliability of student input on CTES feedback, two research questions hadto be answered in order to address the problem statements:

i. Do the students read the presented CTES questions?

ii. Do the students think or consider before answering the questions?

These two research questions were definitely difficult to address by relying on the opinion and confession of students in PrAQ-CTES only. Thus, observation made through the eye tracker instrument was conducted to further reinforce the research results. Eye movement or eye tracking data has been used to address the two research questions which are shown in Table 2:

To address the first research question, the eye movement pattern during reading was explored in detail in ‘Eye Movement or Eye Tracking Data’ section and Figure 2 shows an example of the eye movement pattern during reading. If a student refered to the scale guide before answering the questions (as shown in Figure 3), it showed that the student has thought or considered before answering them.

Table 2. Eye tracking data which was used to address research questions

| Research Questions | Eye Movement or Eye Tracking Data | Example |
|---|---|---|
| Do the students read the presented CTES questions? | Eye movement from left to right along the sentence and a few fixations occur during the movement. | Figure 2 |
| Do the students think or consider before answering the questions? | Refer to CTES scale guide.<br>Circles gathered as *fixation* are many or bigger in the answer scale. | Figure 3<br>Figure 4 |

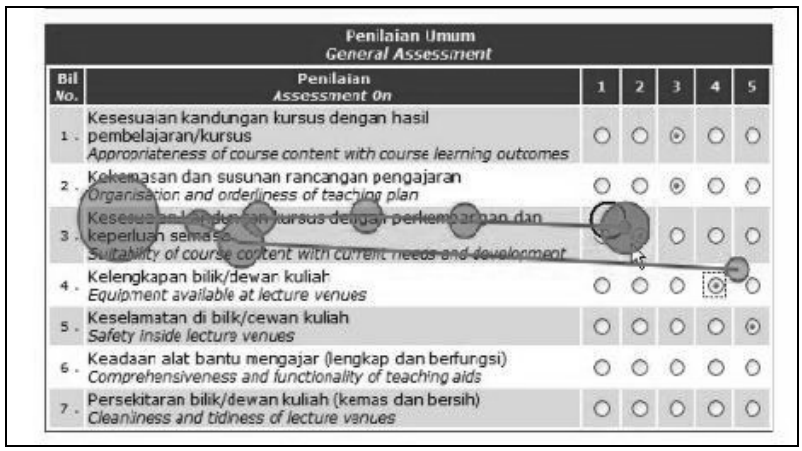


Figure 2 Example of eye movement for students who read the CTES questions

However, not all students refered to the scale guide. This could have been caused by two factors:

(i) Students were used to answering CTES questions or,

(ii) Students were used to the Likert scale especially students who had experience developing questionnaires.

Thus, the second method which showed that students had thought or considered prior to answering questions was the observation on the number or size of *fixation* circles which were found on the answer scale area. Therefore, a student who committed *fixation* a few times (higher number of circles) or took a longer time (bigger circles) while considering an issue thoroughly is illustrated by Figure 4.

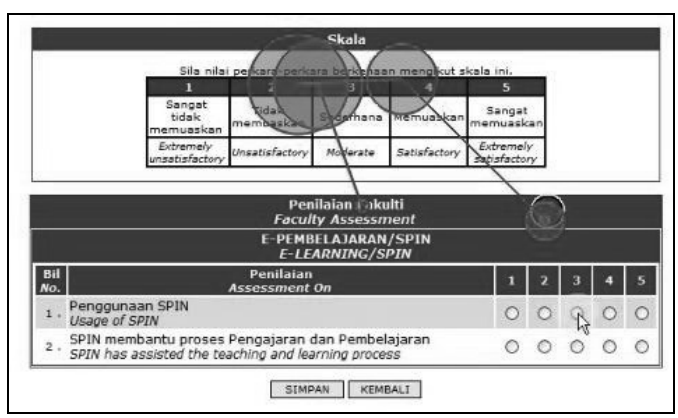


Figure 3 Student referring to answer scale guide when answering

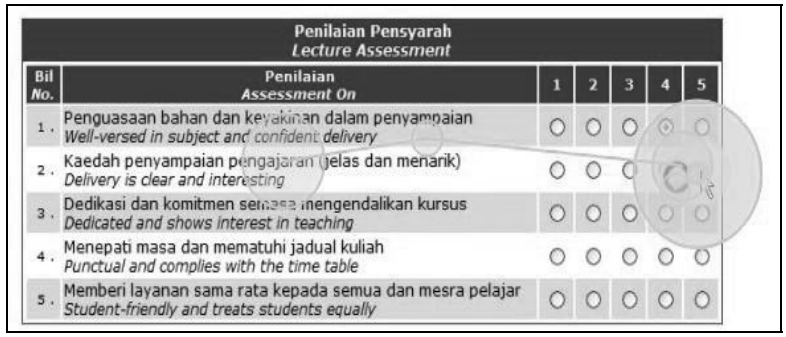


Figure 4 Big *fixation* circles on answer scale implies cognitive process

Based on Pre-CTES, students expressed the opinion that the overall reliability of CTES input was average only (average mean = 3.67). In other words, 41% students were of the opinion that CTES input could not be relied upon and 26% students were uncertain about the overall reliability of CTES input. However, 59% students admitted that they often (mean average = 4.88) used experience or previous memory to answer CTES questions given that the CTES questions were similar for every semester and every course. On the other hand, 67% students stated that they often read and understood CTES questions carefully (mean average = 4.57). Moreover, 41% students expressed their opinions carefully (average mean = 4.24).

This finding was aligned with the observation made through eye tracker. The observation made through eye tracker showed that 57% read every CTES question and 21% students read 50 – 75% of CTES questions. Apart from this, the observation made through eye tracker showed that 43% students refered to the scale guide occasionally and 48% students had bigger or more fixation circles on the answer scale. In addition, eye tracker data indicated that 45% students took longer than 1000ms (milliseconds) for fixation on questions about the evaluation of overall teaching results or long term learning results. This could have been due to the fact that the questions required students to take a longer time to reflect and make deeper considerations on the teaching of the related courses. The following are some examples of questions:

i. Suitability of course content with learning/course results.
ii. Suitability of course content with current developments and needs.
iii. Course content is the source of life-long learning.

Based on the performance guide shown in Table 3, in general, the reliability of student input was concluded to be satisfactory. This was because analysis of the results of Pre-CTES questionnaire and the eye tracker showed most faculties (78%) had more than 40% students reading, comprehending and considering the answers to CTES questions carefully.

Table 3. Performance percentage of results

| Percentage of results | Performance |
|---|---|
| 80 – 100 | Very good |
| 60 – 79 | Good |
| 40 – 59 | Satisfactory |
| 30 – 39 | Weak |
| 0 – 29 | Very weak |

### 4.3 Problems with CTES usability

Based on the PrAQ-CTES questionnaire, the main problems found on CTES were (i) CTES interface was found to be boring (average mean = 4.48), followed by (ii) CTES was found to be a burden because CTES was made a condition for registration for a new semester and provided inefficient feedback (each with average mean = 4.43), and (iii) textual overload in questions (average mean = 4.41).

CTES being made a condition to register for a new semester was found to be burdensome. Moreover, it was believed that this condition caused 69% students to have negative opinions toward CTES (average mean = 4.76). Therefore, 72% students with average mean = 4.90, had the opinion that CTES had to provide them the choice of answering the questions or otherwise. However, 69% students were of the opinion that CTES was important and a medium which gave them the chance to express their opinions (average mean = 5.14) and 50% students were of the opinion that CTES was needed to improve teaching results (mean average = 4.62).

Nonetheless, 93% students thought that CTES needed to be improved (average mean = 6.07). Among the improvements which could be made were delivering more efficient feedback (88% or average mean = 5.95), creating more interesting interface (83% or average mean = 5.61) and reducing the number of questions (74% or average mean = 5.38). In fact, all three recommendations are closely related to the parameters of usability, namely

(i) Efficiency: More efficient feedback,
(ii) Satisfaction: More interesting interface and iii. Effectiveness: Not too many questions, which may result in more care and patience and less boredom during the answering of questions.

The observation made through eye tracker gave detailed information about students being dissatisfied with the CTES interface. The first problem which occured among students was that a certain number of students clicked on the name of a lecturer, not on the lecturer's number button. These students had two or more times of experience in logging in to CTES, but the evaluation through SPPK is done every half yearly only. This may have caused them to forget how to manage CTES easily and quickly. This indicated that the interface of CTES failed to provide high satisfaction to students, especially in factors such as ease of use and ease of remembering.

The second problem which frequently happened was that a number of students did not realize that there would be a change to the list of QUESTION CATEGORY after the students clicked on different course codes which are shown in Figure 5. This may have been caused by the habit of students to scroll down before noticing CATEGORY QUESTION for the course and every course had three similar categories which are general, faculty and lecturer. This situation caused a number of students to lose direction in CTES although it only happened only briefly. This implied that students had to take a few extra steps such as to scroll down to achieve their aims. The extra steps taken in the navigation of the system, which may result in the user losing direction, would definitely delay the promptness of student feedback and indirectly show the inefficiency of the system.

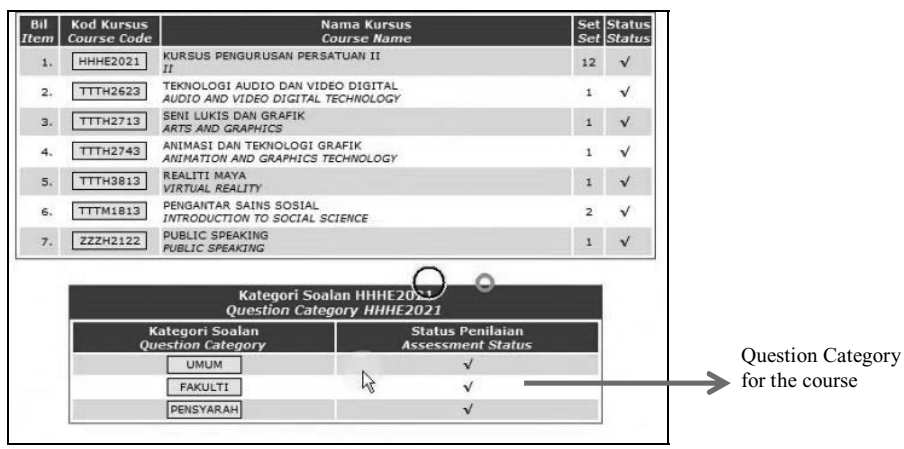


Figure 5 List of category

The observation made through eye tracker showed one obvious situation among respondents, which was that 76% of the students referred to the lecturer's photograph before answering questions. This situation is probably caused by a number of courses having extensive teaching resources which could result in having up to 7 lecturers for one course (FSSK). Thus, students needed the lecturers' photographs as reference to reflect before the evaluation of the lecturer's performance could be completed. This suggests that having the lecturer's photograph presented with the registered course was important for the student. However, research showed that many lecturers had not uploaded

their photographs into the CTES. This situation requires the attention of CTES's management team for it to be overcome.

### 4.4 Student Recommendation

Some student recommendations retrieved through interviews but that may not be found through PrAQ-CTES and eye tracker have been found to be very good for consideration in trying to improve CTES. Among the student recommendations were:

(i) the issue of lecturer evaluation and its effect on students,
(ii) the length of time taken by students to complete CTES.

The first issue most students stated was that they could not evaluate the lecturers based on the lecturers' performance because they were concerned that the evaluation results may bring negative consequences to the lecturers and the lecturers may take certain action against the students especially in the aspect of final examination assessment. Thus, most students took the step of selecting scale 4 or 5 for every CTES question although they were probably dissatisfied with the lecturer's performance. To overcome this problem, students suggested that the outcome of student evaluation of lecturers be released only after the examination grades had been saved into the system.

The second issue was to enable the evaluation of lecturer performance to be completed any time or at least in the middle of semester, and not at the end of the semester. This would result in the lecturers improving their teaching methods.

## 5. Conclusion

In conclusion, the reliability of student feedback is at a satisfactory level. This is shown by the analysis of the results of PrAQ-CTES questionnaire and the eye tracker method where most students in faculties (78%) read, comprehended and considered their answers carefully to at least 48% of CTES questions. The research on usability which was developed in this study is based on three CTES usability constructs which are effectiveness, efficiency and satisfaction. Every construct was found to have two usability problems. Two problems that hampered the effectiveness of CTES have been identified; they are the textual excess in questions and making the CTES evaluation compulsory prior to registering for a new semester. Two problems which may affect the efficiency of CTES are inefficient navigation of the system and system design which may result in the user to losing direction. Finally, the interface of CTES was found to be unattractive, quite boring and some important information such as the lecturer's photographs had not been uploaded for more accurate evaluation.

## 6. Acknowledgement

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